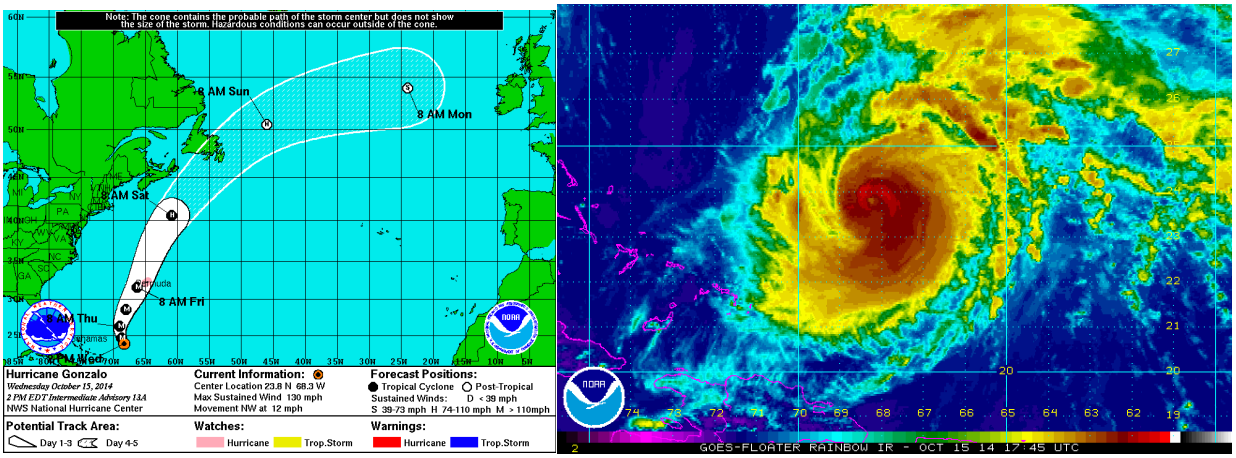
TCI/HS3 2014 15 Oct Flight Report: WB-57 Gonzalo Flight

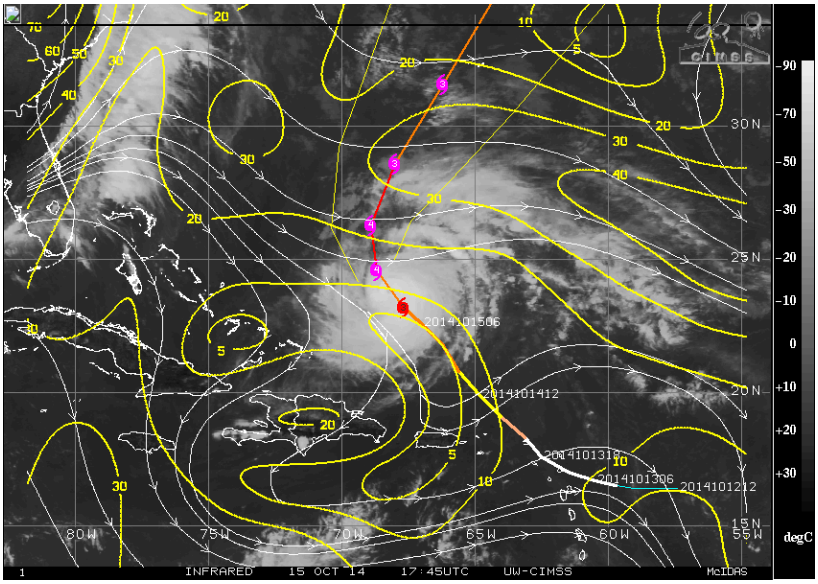
Flight Scientists:
Shift 1 (1000-1800Z): Scott Braun, Paul Newman, Gerry Heymsfield
Shift 2 (1700-0000Z): Anthony Didlake, Chris Velden, Michael Bell
Pete Black and Gerry Heymsfield on site at MacDill

Takeoff: 1828Z
Landing:

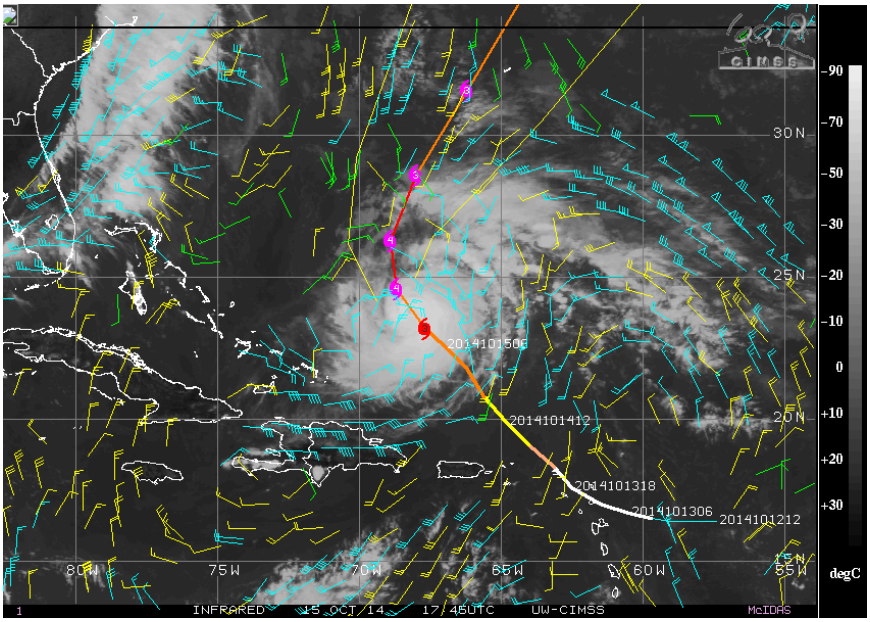
Mission goal: 5.5 hr science flight to investigate Hurricane Gonzalo as it approaches its peak intensity.



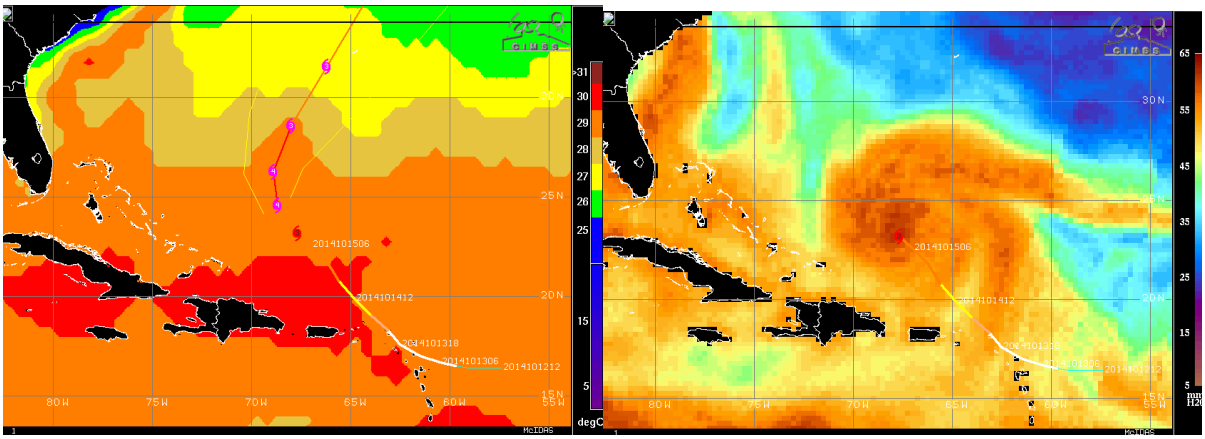
NHC 2pm advisory has Gonzalo at 115 kts/949 mb. Currently moving NW at 12 mph. Forecast is to maintain current intensity for the next 24 hours then weaken slowly as it turns to the NNE and begin ET transition. IR image shows a small symmetrical CDO (roughly 125 nm across EW) and small eye. 1345 vortex data message indicates a 2 nm wide eye.



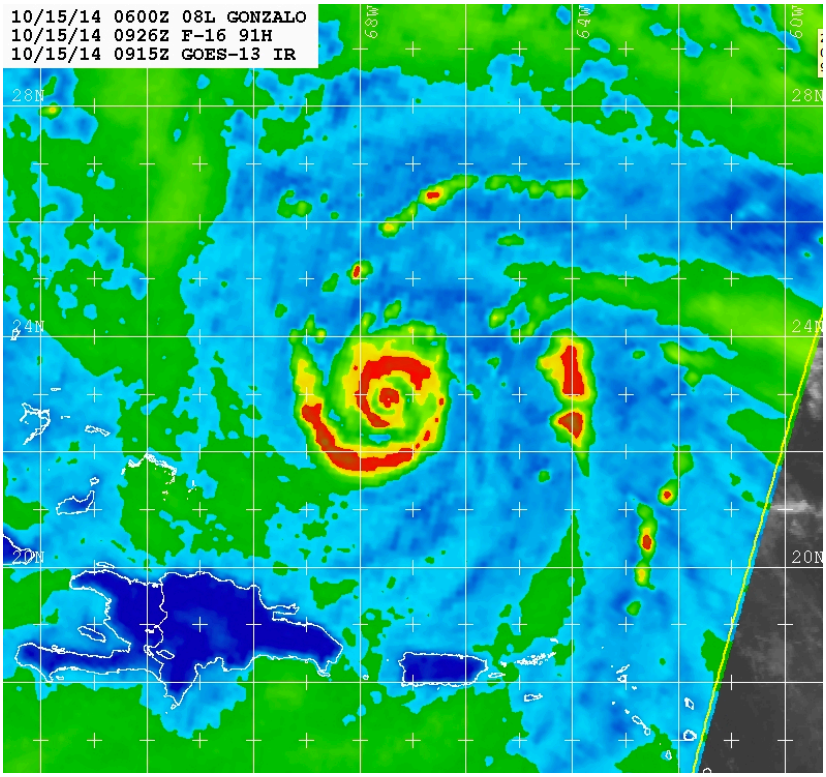
The wind shear over the storm center has decreased from 20 kts to 10 kts in the past 24 hours. Currently experiencing NW shear.



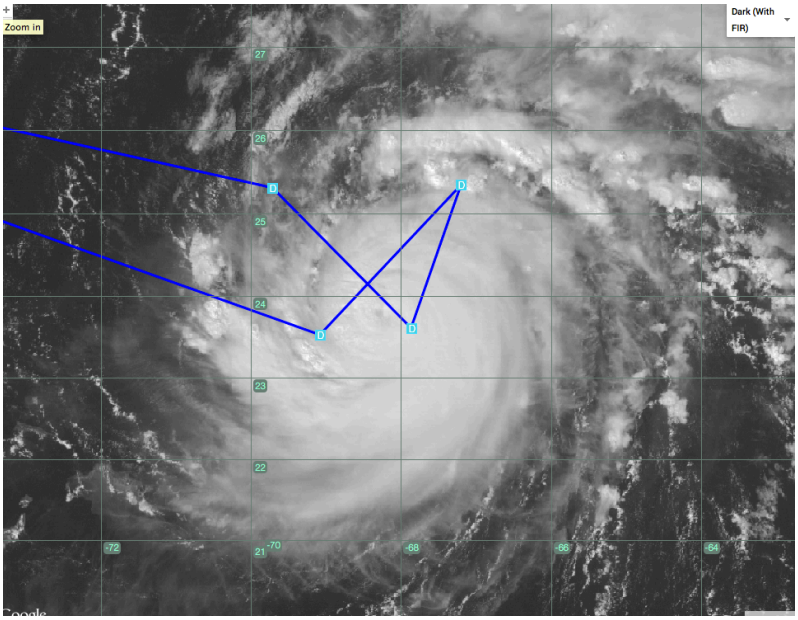
Upper level winds indicate two regions of strong outflow. One outflow jet is to the E and NE while the other is to the S and SW.



Gonzalo will be over >28°C water for the next day. Dry air is to the north and west of the storm, but it doesn't appear to be penetrating the inner core.



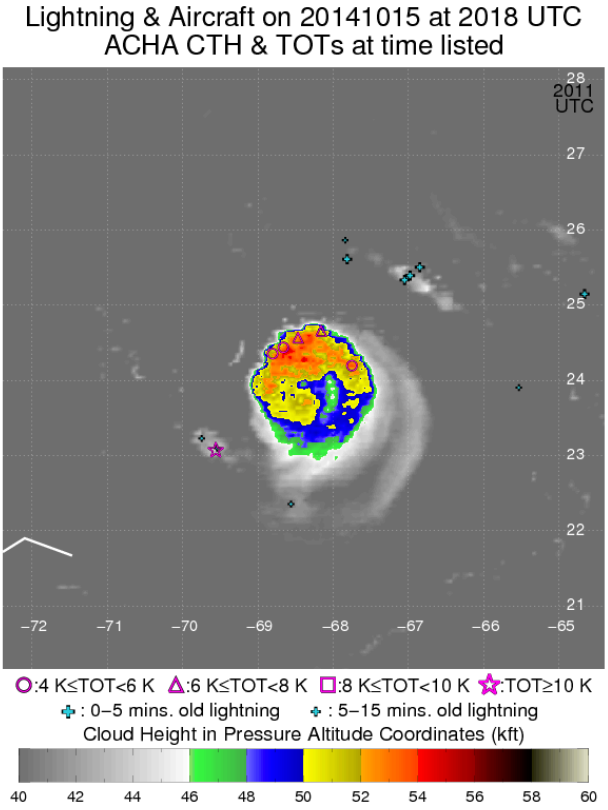
Satellite microwave image from early this morning shows a large rainband to the south spiraling inward into the makings of a concentric ring around the very small inner eyewall. This appears to be the beginning of an eyewall replacement cycle. It will be interesting to see if the inner eyewall actually collapses and how that will impact storm intensity.



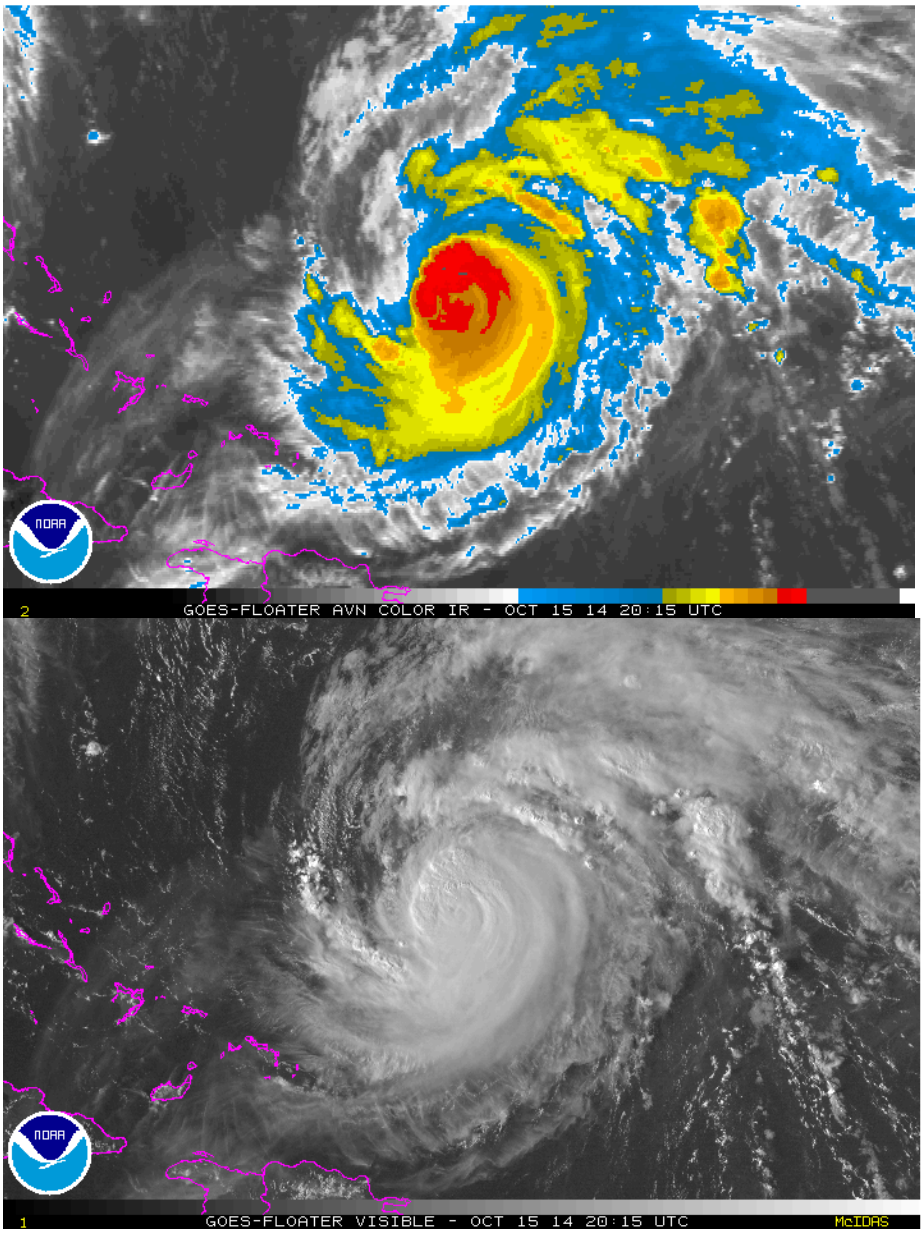
Current flight track plan with southern leg as the inbound leg. The plan is to drop 40 sondes with 4 sondes across 50 nm legs, 3 rapid fire across eye, then 8 along 90 nm legs.

1828Z Take-off from MacDill AFB

1947Z ASDI tracking on Flight Aware has been lost. Plane position not updating on MTS.



2004Z Cloud top height product shows increasing cloud heights (<54 kft) to the north and west of storm center. The highest cloud tops are located roughly in upshear-left quadrant.



2015Z Eye no longer evident in infrared and visible. Likely obscured by recent eruption of convection and weakening inner eyewall.

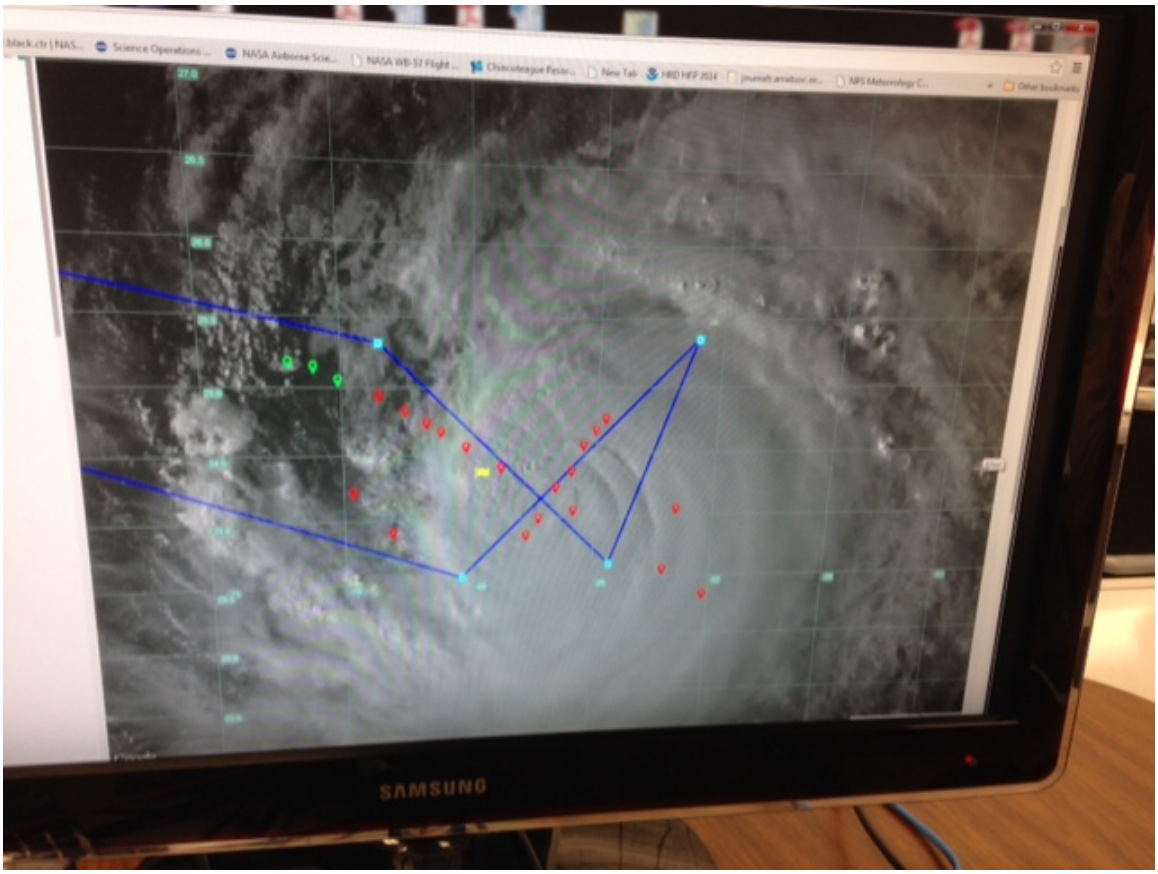
2024Z 4 sondes have apparently been launched successfully and plane is 5 minutes from initial point. Sondes were launched inside of the SW outer band. Still no update on MTS.

2033Z WB-57 reached initial point, launching sondes #5 and #6 and turning inbound toward eye.

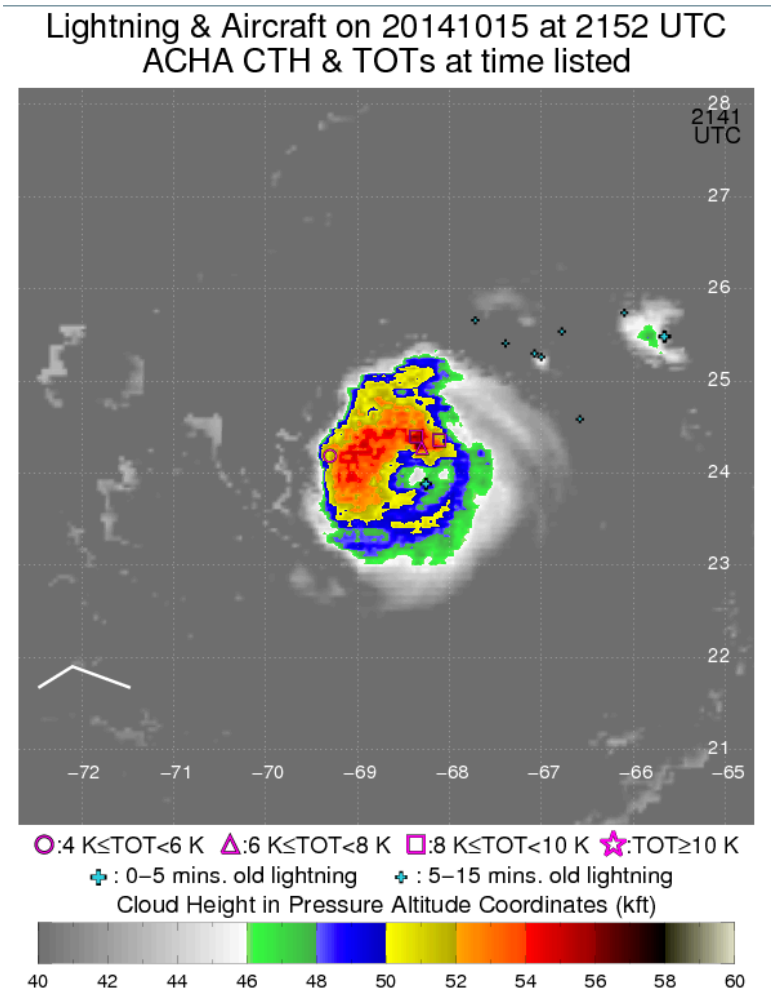
2100Z 19 sondes dropped so far. Plane on SW to NE leg. Still no navigation info.

2100Z NHC 5pm advisory has slight weakening of Gonzalo to 110 kts/953 mb. Movement has slowed slightly to NW 10 mph.

2128Z 30 sondes launched.



2149Z Image of successful dropsonde launch points (red markers) with planned flight track. Courtesy of Gerry Heymsfield.



2152Z Cloud top heights still in excess of 54 kft. Highest cloud tops are WNW of eye. This eruption of eyewall convection possibly associated with diurnal cycle of convection.

Post-mission synopsis by Pete Black as plane headed back to MacDill:
“Looks like 39 XDDs were launched successfully and returned data. Both sequences of 3 sondes across eye appear to have actually dropped into the eye. SW to NE leg was 100 nm total and (50 nm radius) along which 12 sondes were deployed. SE to NW leg was 180 nm with 22 sondes deployed. How much data was acquired exactly is TBD after the plane lands and we have time to look at it, which may be a day or two since available time tonight is to be used for tomorrows flight preparations.

Today was an incredible example of ingenuity and creativity. BFT went down, ASDI from Flight Aware went out, internet was incredibly slow such that MTS took 3-4 min to update images and ichat refused to work. What saved the day was the Iridium transmitted info including positions that were sent back with XDD packets. Mark read posits verbally to me while I entered them manually into MTS with latest VIS sat image updates. Rocky confirmed aircraft position verbally via SATPHONE. However, SATPHONE and INMARSAT went down periodically and we had to 'dead reckon' aircraft estimated position during dropout periods. All sondes were deployed remotely by Mark from here at KMCF. Our fourth backup procedure was to have

sondes launched manually from aircraft by SEO. However, this was off the table due to the computer failure on the aircraft at the SEO position early in the flight.

After preliminary review of today's XDD data, engineers at Yankee have determined that only 28 of 39 XDD's deployed on today's flight returned data. Of the 28, most suffered from excessive noise problems and data dropouts with very few returning a complete profile to the surface. HIRAD and HIWRAP appeared to perform well. Tomorrow's flight will proceed as planned with the emphasis on obtaining another good data set for HIRAD and HIWRAP, with perhaps 6-8 additional sondes deployed from HDSS for further de-bugging purposes."